

## WHAT IS CLAIMED IS:

1. A sound signal encoding apparatus for encoding two different sound signals, comprising:

5 sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first channel signal and a second channel signal;

10 first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

sampling rate selecting means for selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

15 sound signal sampling means for sampling each of said analyzed sound signal sections at said sampling rate selected by said sampling rate selecting means;

second sound signal sections analyzing means for analyzing each of said divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

20 frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

25 quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

compression level calculating means for calculating a compression level for each of said sound signal sections;

30 compression level judging means for judging whether or not said calculated compression level for each of said sound signal sections exceeds a predetermined threshold compression value;

35 first frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of

one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

5           second frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said  
10   above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

          frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined  
15   quantization bit numbers under two different states consisting of a first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing means when said compression level judging means is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and a second  
20   state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said compression level judging means is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value; and

25           frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing means when said  
30   compression level judging means is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said compression level judging means is operative to judge  
35   that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value, said multiplexed bit stream with said

predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

- 5     2.     A sound signal encoding apparatus for encoding two different sound signals, comprising:

         sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first  
10    channel signal and a second channel signal;

         first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

         sampling rate selecting means for selecting one arbitrary sampling rate for  
15    each of said analyzed sound signal sections from among predetermined sampling rates;

         sound signal sampling means for sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting means;

         second sound signal sections analyzing means for analyzing each of said  
20    divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

         frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above  
25    first signal being indicative of intensities, and said above second signal being indicative of frequencies;

         quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

         compression level calculating means for calculating a compression level for  
30    each of said sound signal sections;

         compression level judging means for judging whether or not said compression level for each of said sound signal sections exceeds a predetermined threshold compression value;

         first frequency components compressing means for compressing said  
35    frequency components for each of said sound signal sections with two different

information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

second frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined quantization bit numbers under two different states consisting of a first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said compression level judging means is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and a second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing means when said compression level judging means is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value; and

frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said compression level judging means is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing means when said compression level judging means is operative to judge

that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded  
5 and decoded.

3. A sound signal encoding apparatus for encoding two different sound signals, comprising:

10 sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first channel signal and a second channel signal;

15 first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

sampling rate selecting means for selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

20 sound signal sampling means for sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting means;

second sound signal sections analyzing means for analyzing each of said divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

25 frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

30 quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

energy ratio calculating means for calculating an energy ratio for each of said sound signal sections;

35 energy ratio judging means for judging whether or not said energy ratio for each of said sound signal sections exceeds a predetermined threshold energy value;

first frequency components compressing means for compressing said

frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

second frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined quantization bit numbers under two different states consisting of a first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and a second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value; and

frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said

sound signal sections does not exceed said predetermined threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

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4. A sound signal encoding apparatus for encoding two different sound signals, comprising:

sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said  
10 sound signals to be taken for receiving therein, said sound signals consisting of a first channel signal and a second channel signal;

first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

15 sampling rate selecting means for selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

sound signal sampling means for sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting means;

20 second sound signal sections analyzing means for analyzing each of said divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for  
25 each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound  
30 signal sections;

energy ratio calculating means for calculating an energy ratio for each of said sound signal sections;

energy ratio judging means for judging whether or not said energy ratio for each of said sound signal sections exceeds a predetermined threshold energy value;

35 first frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different

information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

second frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined quantization bit numbers under two different states consisting of a first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and a second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value; and

frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined



threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

- 5     5.     A sound signal encoding apparatus for encoding two different sound signals, comprising:

          sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first  
10    channel signal and a second channel signal;

          first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

- sampling rate selecting means for selecting one arbitrary sampling rate for  
15    each of said analyzed sound signal sections from among predetermined sampling rates;

          sound signal sampling means for sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting means;

- second sound signal sections analyzing means for analyzing each of said  
20    divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

- frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above  
25    first signal being indicative of intensities, and said above second signal being indicative of frequencies;

          quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

- 30        compression level calculating means for calculating a compression level for each of said sound signal sections;

- threshold energy value selecting means for selecting one arbitrary threshold energy value for each of said sound signal sections from among predetermined threshold energy values based on said compression level calculated by said  
35    compression level calculating means;

          energy ratio calculating means for calculating an energy ratio for each of said

sound signal sections;

energy ratio judging means for judging whether or not said energy ratio for each of said sound signal sections exceeds said threshold energy value selected by said threshold energy value selecting means;

5 first frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency  
10 components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

second frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different  
15 information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for  
20 said second channel signal;

frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined quantization bit numbers under two different states consisting of a first state in which said frequency components for each of said sound signal sections are compressed by  
25 said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and a second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said energy ratio judging  
30 means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value; and

frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first  
35 state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing means when said energy

ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

6. A sound signal encoding apparatus for encoding two different sound signals, comprising:

sound signals dividing means for dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first channel signal and a second channel signal;

first sound signal sections analyzing means for analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

sampling rate selecting means for selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

sound signal sampling means for sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting means;

second sound signal sections analyzing means for analyzing each of said divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

frequency components calculating means for calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

quantization bit numbers allocating means for allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

compression level calculating means for calculating a compression level for

each of said sound signal sections;

threshold energy value selecting means for selecting one arbitrary threshold energy value for each of said sound signal sections from among predetermined threshold energy values based on said compression level calculated by said

5 compression level calculating means;

energy ratio calculating means for calculating an energy ratio for each of said sound signal sections;

energy ratio judging means for judging whether or not said energy ratio for each of said sound signal sections exceeds said threshold energy value selected by  
10 said threshold compression value selecting means.

first frequency components compressing means for compressing said frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of said intensities and said above second signal being indicative of ratio of  
15 one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

second frequency components compressing means for compressing said  
20 frequency components for each of said sound signal sections with two different information consisting of first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency  
25 components for said first channel signal and each of said frequency components for said second channel signal;

frequency components quantizing means for quantizing each of said frequency components for each of said sound signal sections at predetermined quantization bit numbers under two different states consisting of a first state in which  
30 said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and a second state in which said frequency components for each of said sound signal sections are not  
35 compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said

sound signal sections does not exceed said selected threshold energy value; and

frequency components encoding means for encoding said quantized frequency components for each of said sound signal sections to a multiplexed bit stream with a predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing means when said energy ratio judging means is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

7. A sound signal encoding apparatus as set forth in claim 1, in which said compression level calculating means is operative to calculate said compression level for each of said sound signal sections with the compression ratio of said selected sampling rate to said predetermined bit rate at which said multiplexed bit stream is outputted by said frequency components encoding means.

8. A sound signal encoding apparatus as set forth in claim 3, in which said energy ratio calculating means is operative to calculate five different information consisting of first to fifth signal; said above first signal is indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal; said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal; said above third signal is indicative of said energy level with said above first signal; said above fourth signal is indicative of said energy level with said above second signal; and said above fifth signal is indicative of the energy ratio of said above third signal to said above fourth signal.

9. A sound signal delivery system, comprises: a sound signal encoding apparatus as set forth in claims 1, a server unit for accumulating the sound signals

encoded by the sound signal encoding apparatus, a plurality of terminal units for requesting said sound signals encoded by the sound signal encoding apparatus, and a network between said server unit and said terminal units to have said server unit and said terminal units electrically connected to each other, said sever unit being operative to deliver said sound signals encoded by the sound signal encoding apparatus to said terminal units through said network when said terminal units are operative to request said sever unit to deliver said sound signals encoded by the sound signal encoding apparatus to said terminal units.

10 10. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of a first channel signal and a second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

a sound signal sampling step of sampling each of said analyzed sound signal sections at said sampling rate selected by said sampling rate selecting step;

a second sound signal sections analyzing step of analyzing each of said divided sound signal sections based on a psycho acoustic model obtained by taking advantage of human's hearing characteristics;

a frequency components calculating step of calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

a quantization bit numbers allocating step of allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

a compression level calculating step of calculating a compression level for each of said sound signal sections;

a compression level judging step of judging whether or not said compression level for each of said sound signal sections exceeds said predetermined threshold compression value;

5 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

15 a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

20 a frequency components quantizing step of quantizing each of said frequency components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value; and

30 a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with said predetermined bit rate under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said

compression level judging step is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components  
5 compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded  
10 and decoded.

11. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound  
15 signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of said first channel signal and said second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided  
20 sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting one arbitrary sampling rate for each of said analyzed sound signal sections from among predetermined sampling rates;

a sound signal sampling step of sampling each of said divided sound signal  
25 sections at said sampling rate selected by said sampling rate selecting step ;

a second sound signal sections analyzing step of analyzing each of said divided sound signal sections based on said psycho acoustic model obtained by taking advantage of human's hearing characteristics;

a frequency components calculating step of calculating frequency  
30 components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

a quantization bit numbers allocating step of allocating said quantization bit  
35 numbers for each of said calculated frequency components for each of said sound signal sections;



a compression level calculating step of calculating a compression level for each of said sound signal sections;

5 a compression level judging step of judging whether or not said compression level for each of said sound signal sections exceeds said predetermined threshold compression value;

10 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

15 a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

20 a frequency components quantizing step of quantizing each of said frequency components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value; and

35 a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with said predetermined bit rate under said two different states consisting of said first state

in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections exceeds said predetermined threshold compression value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said compression level judging step is operative to judge that said compression level for each of said sound signal sections does not exceed said predetermined threshold compression value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

12. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of said first channel signal and said second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting said one arbitrary sampling rate for each of said sound signal sections from among said predetermined sampling rates based on each of said sound signal sections analyzed by said first sound signal analyzing step;

a sound signal sampling step of sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting step;

a second sound signal sections analyzing step of analyzing each of said divided sound signal sections based on said psycho acoustic model obtained by taking advantage of human's hearing characteristics;

a frequency components calculating step of calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

a quantization bit numbers allocating step of allocating said quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

5 an energy ratio calculating step of calculating an energy ratio for each of said sound signal sections;

an energy ratio judging step of judging whether or not said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value;

10 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel  
15 signal;

a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel  
20 signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

a frequency components quantizing step of quantizing each of said frequency  
25 components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds  
30 said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value; and

35 a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with

said predetermined bit rate under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

13. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of said first channel signal and said second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting one arbitrary sampling rate for each of said sound signal sections from among said predetermined sampling rates based on each of said sound signal sections analyzed by said first sound signal analyzing step;

a sound signal sampling step of sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting step ;

a second sound signal sections analyzing step of analyzing each of said divided sound signal sections based on said psycho acoustic model obtained by taking advantage of human's hearing characteristics;

a frequency components calculating step of calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

a quantization bit numbers allocating step of allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

5 an energy ratio calculating step of calculating an energy ratio for each of said sound signal sections;

an energy ratio judging step of judging whether or not said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value;

10 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

15 a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

20 a frequency components quantizing step of quantizing each of said frequency components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value; and

30 a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with

said predetermined bit rate under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said predetermined threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said predetermined threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

14. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of said first channel signal and said second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting said one arbitrary sampling rate for each of said sound signal sections from among said predetermined sampling rates based on each of said sound signal sections analyzed by said first sound signal analyzing step ;

a sound signal sampling step of sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting step;

a second sound signal sections analyzing step of analyzing each of said divided sound signal sections based on said psycho acoustic model obtained by taking advantage of human's hearing characteristics;

a frequency components calculating step of calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

a quantization bit numbers allocating step of allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

5 a compression level calculating step of calculating a compression level for each of said sound signal sections;

a threshold energy value selecting step of selecting said one arbitrary threshold energy value for each of said sound signal sections from among said predetermined threshold energy values based on said compression level calculated by said compression level calculating step;

10 an energy ratio calculating step of calculating an energy ratio for each of said sound signal sections;

an energy ratio judging step of judging whether or not said energy ratio for each of said sound signal sections exceeds said threshold energy value selected by said threshold energy value selecting step;

15 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

20 a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal;

25 a frequency components quantizing step of quantizing each of said frequency components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds

said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value; and

a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with said predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said first frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

15. A sound signal encoding method for encoding two different sound signals, comprising:

a sound signals dividing step of dividing each of said two different sound signals into a plurality of sound signal sections along a time axis for each of said sound signals to be taken for receiving therein, said sound signals consisting of said first channel signal and said second channel signal;

a first sound signal sections analyzing step of analyzing each of said divided sound signal sections based on the sound signal characteristics inherent in said sound signal;

a sampling rate selecting step of selecting said one arbitrary sampling rate for each of said sound signal sections from among said predetermined sampling rates based on each of said sound signal sections analyzed by said first sound signal analyzing step;

a sound signal sampling step of sampling each of said divided sound signal sections at said sampling rate selected by said sampling rate selecting step;

a second sound signal sections analyzing step of analyzing each of said



divided sound signal sections based on said psycho acoustic model obtained by taking advantage of human's hearing characteristics;

5 a frequency components calculating step of calculating frequency components with two different information consisting of first and second signals for each of said sound signal sections sampled at said selected sampling rate, said above first signal being indicative of intensities, and said above second signal being indicative of frequencies;

10 a quantization bit numbers allocating step of allocating quantization bit numbers for each of said calculated frequency components for each of said sound signal sections;

a compression level calculating step of calculating said compression level for each of said sound signal sections;

15 a threshold energy value selecting step of selecting said one arbitrary threshold energy value for each of said sound signal sections from among said predetermined threshold energy values based on said compression level calculated by said compression level calculating step;

an energy ratio calculating step of calculating said energy ratio for each of said sound signal sections;

20 an energy ratio judging step of judging whether or not said energy ratio for each of said sound signal sections exceeds said threshold energy value selected by said threshold compression value selecting step;

25 a first frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of said intensity and said above second signal being indicative of ratio of one of said frequency components for said first channel signal and said frequency components for said second channel signal to the other of said frequency components for said first channel signal and said frequency components for said second channel signal;

30 a second frequency components compressing step of compressing said frequency components for each of said sound signal sections with said two different information consisting of said first and second signals, said above first signal being indicative of the addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal, and said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for

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said second channel signal;

5 a frequency components quantizing step of quantizing each of said frequency components for each of said sound signal sections at said predetermined quantization bit numbers under said two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value; and

15 a frequency components encoding step of encoding said quantized frequency components for each of said sound signal sections to said multiplexed bit stream with said predetermined bit rate under two different states consisting of said first state in which said frequency components for each of said sound signal sections are compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections exceeds said selected threshold energy value and said second state in which said frequency components for each of said sound signal sections are not compressed by said second frequency components compressing step when said energy ratio judging step is operative to judge that said energy ratio for each of said sound signal sections does not exceed said selected threshold energy value, said multiplexed bit stream with said predetermined bit rate being constituted by said sound signals for each of said sound signal sections and general information needed for said sound signals to be encoded and decoded.

16. A sound signal encoding method as set forth in claim 1, in which said compression level calculating step is of calculating said compression level for each of said sound signal sections with said compression ratio of said selected sampling rate to said predetermined bit rate at which said multiplexed bit stream is outputted by said frequency components encoding step .

17. A sound signal encoding method as set forth in claim 3, in which said energy ratio calculating step is of calculating five different information consisting of first, second, third, fourth, and fifth signal; said above first signal is indicative of the

addition of each of said frequency components for said first channel signal and each of said frequency components for said second channel signal; said above second signal being indicative of the difference between each of said frequency components for said first channel signal and each of said frequency components for said second channel signal; said above third signal is indicative of said energy level with said above first signal; said above fourth signal is indicative of said energy level with said above second signal; and said above fifth signal is indicative of the energy ratio of said above third signal to said above fourth signal.

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